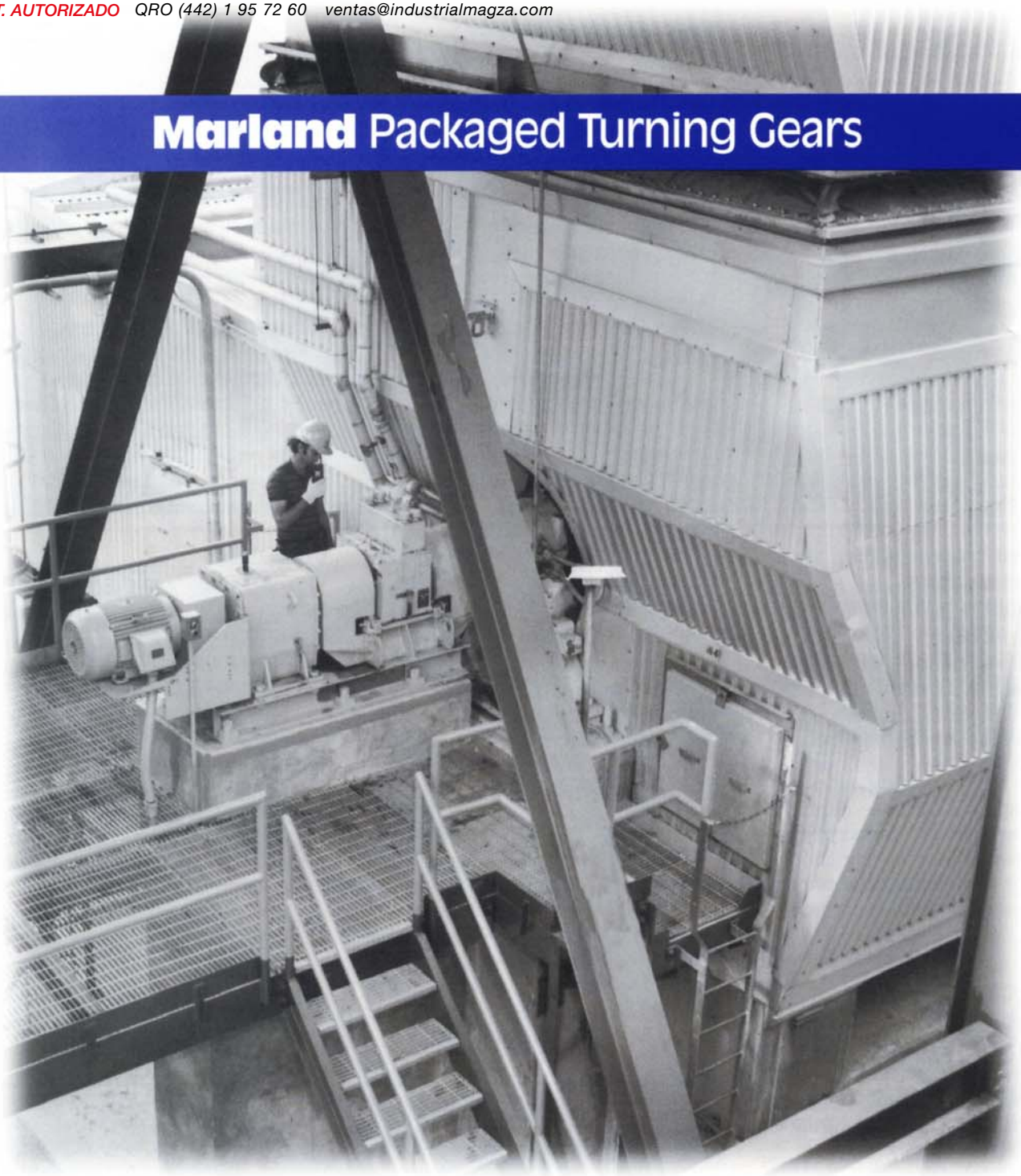
Marland Packaged Turning Gears



For Induced Draft and Hot Gas Recirculating Fans and Other Industrial Uses

Marland Clutch

Turning Gears

Turning Gears are a unitized power package consisting of a motor, reducer, CECON clutch, couplings, and guards, all mounted on a heavy, rigid, steel base. Turning gears are used on induced draft, hot gas recirculating, and other fans for several reasons:

1. To maintain sufficient fan speed when the main drive is shut down to prevent distortion of the fan blades and "sagging" of the fan rotor due to heat.
2. To keep fan sleeve bearings lubricated, preventing "dry" starts of the main motor.
3. If sized properly, the turning gear can be used to start the high inertial load of the fan, greatly reducing the current draw of the main motor during startup, and should provide extended life of main motor.
4. On fans handling "dirty" air or gases, special low speed turning gears can be used for fan washdown, thereby eliminating "jogging" of the main motor or the use of manual methods to move the fan.

Marland CECON Clutch

The heart of the Marland turning gear is the CECON clutch which utilizes the Marland principle of rollers on inclined cam planes. CECON clutches have proven their dependability for over 60 years in worldwide installations, and are designed for continuous, uninterrupted operation in adverse ambient conditions with minimum maintenance requirements.

CECON clutches consist of a completely enclosed housing with provisions for supporting a Marland freewheeling clutch between two shafts, each of which is separately supported. The stationary housing is of a rugged, cast construction with liberal cooling area to permit heat dissipation and provides a large oil reservoir with many times the oil capacity of ordinary clutches. Provision is made against unnecessary churning of the oil with ample reservoirs to retain the excess oil volume out of the rotating clutch chamber. This oil is cooled and recirculated in controlled volume back to the main chamber.

All of this is done internally and mechanically. No pumps, cooling connections or other external equipment is required.

In addition, the CECON clutch can be furnished with a disconnect, lock out feature if required by any applicable industry standards or customer preference. This feature provides an actual separation of the input and output end of the CECON, thereby permitting maintenance to be performed on the turning gear motor or reducer while the main drive is operating.

Typical Drive Arrangements

The most common drive arrangement can be seen in illustration 1 below, and in use on the cover photo. This "in-line" design allows for direct coupling connection of all components and is suitable for most new installations.

For installations where space limitations prohibit the "in-line" design, alternate arrangements can be made to suit existing conditions. A right angle reducer can be used to reduce the overall length of the package or a "piggy back" design as shown in illustration 2 *(page 2)*.

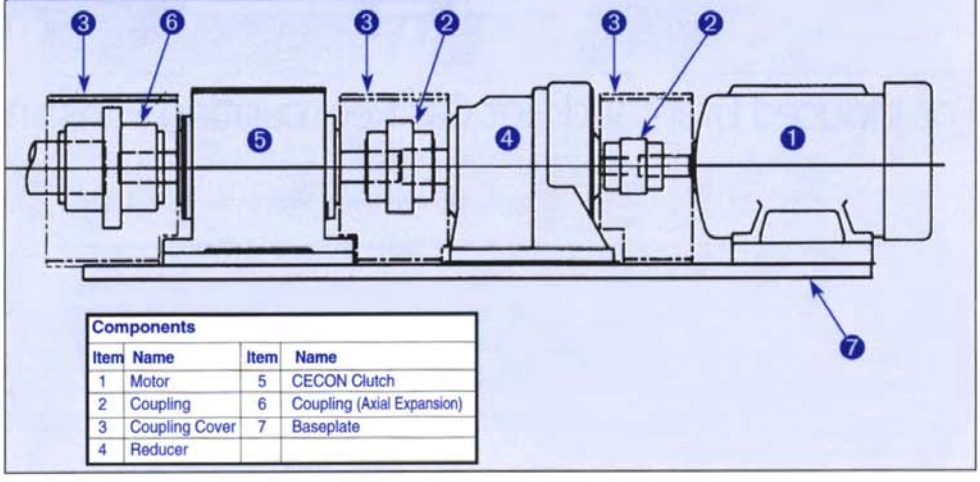
Marland has also engineered and manfactured a "u-shaped" package due to space limitations, utilizing a chain drive for additional speed reduction in the very low speed fan "wash down" design shown in illustration 3 *(page 2)*.

Variations

Turning gear packages can include certain variations based on application requirements:

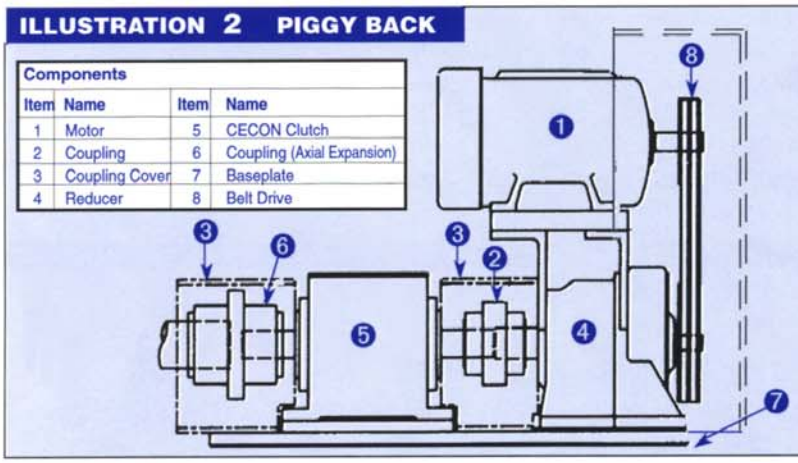
1. **Backstops—** If there is a potential for the reversal of the fan due to back pressure or flow, a backstop can be provided to prevent such a reversal from occurring.
2. **Stub shaft adaptor—** When adapting a turning gear to an existing fan, there may not be enough shaft extension through the bearing on the side opposite the main drive to accommodate a coupling half. Marland can design and furnish an adaptor to extend the shaft sufficiently in order to mount the coupling.

ILLUSTRATION 1 IN-LINE



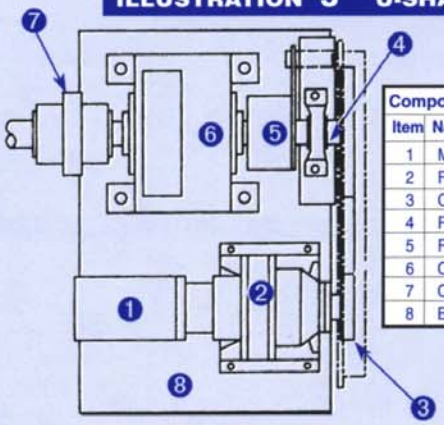
Components			
Item	Name	Item	Name
1	Motor	5	CECON Clutch
2	Coupling	6	Coupling (Axial Expansion)
3	Coupling Cover	7	Baseplate
4	Reducer		

ILLUSTRATION 2 PIGGY BACK



Components			
Item	Name	Item	Name
1	Motor	5	CECON Clutch
2	Coupling	6	Coupling (Axial Expansion)
3	Coupling Cover	7	Baseplate
4	Reducer	8	Belt Drive

ILLUSTRATION 3 U-SHAPE



Components	
Item	Name
1	Motor
2	Reducer
3	Chain Drive
4	Pillow Block Brg.
5	Ringspan Backstop
6	CECON Clutch
7	Coupling(Axial Expansion)
8	Baseplate

3. **Special motors—** Turning gear packages-can be furnished with special motors designed for "mill and chemical" use or "wash down" applications or any other special requirements.
4. **Painting—** Turning gears operating in corrosive or other problem ambient environments can be prepared and painted according to customer specifications for the particular atmospheric condition.

Other Uses

Turning gear drives have applications in other industries, where they are known by different names.

1. **Creep drives or pony drives—** On large belt conveyor drives as used in the mining industry, a creep drive is used in cold climates to prevent the belt from freezing during idle periods. These belts can be extremely difficult to start if they "set" around pulleys during a week-end or other "down" time. The creep drive can also be used for belt inspection, thereby eliminating the need to "jog" the main motor drive.
2. **Starter drives—** Electric motors in the very high horsepower sizes require an extremely high current draw to start from rest. In some areas, these high current demands cannot be met due to utility, wiring or other limitations. A smaller starter drive motor requires much less current to start the large drive motor and bring it up to a speed where the main motor can then accelerate to running speed within the existing electrical limitations.
3. **Two speed drives—**There are some industrial applications—large mixers, blenders, ball mills, etc.—which require two different operating speeds for processing purposes. A Marland package can be designed to meet the lower speed needs of the process.

To properly size a turning gear package, the following data is necessary to ensure a long-life, trouble free installation.

Main Drive:

Motor H.P._____
Brg. Dia._____
Motor RPM_____
Motor WR^2_____
Motor Rotor Wt._____
Fan WR^2_____
Fan Rotor Wt._____
Fan Brg. Dia._____
Fan Axial Expansion_____
Brg. Center Distance_____
Operating Temperature_____
Fan Break Away Temperature_____
Fan Break Away Torque(Cold)_____
Fan Shaft Turn Down Dia._____

Turning Gear:

Minimum Speed (RPM)_____
Start From Rest?_____
Catch on Coast Down?_____
Required to Operate at a Voltage Variance of ± (%)_____
H.P. (if specified)_____
Voltage_____
Hz_____Phase_____
Startup Frequency (number/times-per week)_____
Backstop Required?_____
Special Conditions_____